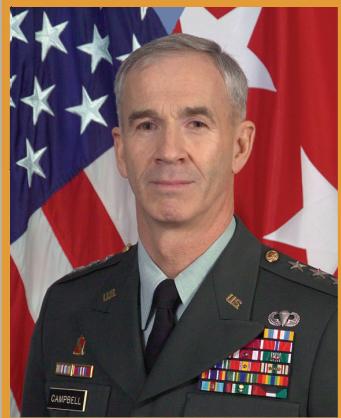


LTG Kevin T. Campbell

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50 YEARS IN SPACE

By LTG Kevin T. Campbell

On Oct. 3, 1957, the Army created the Redstone Anti-Missile Missile Systems Office in Huntsville, Ala., to begin research that would lead to development of the NIKE-ZEUS anti-missile system. This date marks the beginning of today's Space and Missile Defense Command which is celebrating 50 years as the Army's lead for all Space and missile defense actions. This date also happens to be the eve of man's first Space milestone; the successful orbiting of a manmade satellite. Russia's launch of the Sputnik satellite on Oct. 4, 1957, heralded the beginning of the Space race, and the beginning of 50 years of very rapid advancement in Space technologies. Who would have believed that this 184-pound basketball-size satellite, circling at a maximum of 560 miles above the earth, at a speed of 18,000 miles an hour, would someday give birth to today's Space capabilities.

Launch of Freedom 7, the
first American manned
Space flight on the Mercury-
Redstone (MR-3) rocket
Credit: NASA



During the past 50 years, America has experienced all of man's triumphs and tragedies in Space. Some of you may remember December 1958, when President Dwight D. Eisenhower sent his Christmas greeting to the world from the Army's Project SCORE (Signal Communication by Orbiting Relay Equipment); the world's first communications satellite. Many of you may also remember when Americans were extremely anxious after a Soviet astronaut named Yuri Gagarin became the first man in Space on April 12, 1961, and intensely proud when 23 days later, Commander Alan Shepard became the first American in Space; placed there, by the way, on an Army Redstone developed rocket.

Our nation experienced great sorrow, when America suffered her first Space casualties on Jan. 27, 1967. That is when Astronauts Gus Grissom, Ed White and Roger Chaffee tragically lost their lives after a flash fire broke out in the first Apollo Command Module during a launch pad test at Launch Complex 34. Their deaths led to a redesign of the Apollo Capsule, and the successful completion of a program that safely landed the first men on the moon.

There were to be many more triumphs and failures during the decades of Space exploration leading up to today. Some would remind us just how very dangerous Space travel can be, and others would forever change our view of the world and how we interact on a global scale. Space is the reason we now have instantaneous global communications as well as the ability to carry out rapid, global, financial transactions. Because of Space, we can easily navigate to any given point on the earth and we can obtain high resolution maps of our destination when we want them. Weather forecasts are much more accurate, and we have the ability to

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identify and track major weather events.

From the perspective of the United States Army, Space exploration and commercialization has profoundly impacted day-to-day combat operations and has totally changed the face of modern warfare. The Army is no longer a static, forward deployed force, operating from legacy war plans. Instead, the Army has transformed to a modular force, capable of placing maximum fire power upon a given objective with minimal notice. Successful deployment of multiple unit configurations, into unfamiliar areas, and often in support of Joint and/or multinational operations, demands the effective use of all available Space Force Enhancement. Army Field Manual 3-14, Space Support to Army Operations, identifies five Space Force Enhancement areas.

- Communications;
- Position, velocity and timing;
- Environmental monitoring (Space and terrestrial weather);
- Intelligence, surveillance, and reconnaissance; and
- Theater missile warning.

Space Force Enhancement assures the Army's ability to deploy its warfighting capability to any location in the world. They allow our troops to maintain full situational awareness of their position, the position of friendly forces, terrain information, current and projected weather conditions, enemy troop locations and capabilities. Space Force Enhancements also give our troops the ability to effectively communicate with other warfighters within their area of operation, and to reachback to rear support capabilities, including the United States.

U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (SMDC/ARSTRAT) is responsible for assuring all Army forces have access to these Space Force Enhancement capabilities in order to accomplish their assigned missions.

Our vision is *"to provide dominant Space and missile defense capabilities for the Army; to plan for and integrate those capabilities in support of U.S. Strategic Command (USSTRATCOM) and the Geographic Combatant Commanders' missions." This vision is implemented under SMDC/ARSTRAT's Mission: "SMDC/ARSTRAT conducts Space and missile defense operations and provides planning, integration, control and coordination of Army forces and capabilities in support of USSTRATCOM missions; serves as proponent for Space and ground-based midcourse defense; is the Army operational integrator for global missile defense; conducts mission related research, development and acquisition in support of Army Title 10 responsibilities and serves as the focal point for desired characteristics and capabilities in support of USSTRATCOM missions."*

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Space Support to the Warfighter

The Army is leveraging Space-based capabilities in support of the Joint warfighter in many ways, including the use of other Space professionals and experts in addition to Space Operations Officers. Examples include the Army Space Support Teams (ARSSTs) who rapidly deploy worldwide to deliver Space capabilities, services, and expertise in support of ground forces to include numbered Armies, Corps, Special Forces, Marine Expeditionary Forces (MEF) and Joint Task Forces during exercises and contingency operations. Team members serve as Space subject matter experts across the supported unit's staff. Their mission focus is Space force enhancement operations. At present, there are six Active Duty and four Army Reserve teams activated under the 1st Space Battalion, 2nd Space Company with an additional 11 teams forming under the Colorado Army National Guard. The end state for the ARSST force structure is 27 teams across the Active, Reserve and National Guard structures.

The Joint Tactical Ground Station (JTAGS) is the Army's primary system for providing integrated, in-theater, 24-hour overhead non-imaging infrared detection capability for processing and disseminating ballistic missile early warning and alerting data to combatant commanders and missile defense assets. By processing direct down-linked infrared data, JTAGS provides timely notification of ballistic missile launches to theater forces. The Army's JTAGS provides assured missile warning to the combatant commander. The follow-on JTAGS capability will provide an expanded in-theater capability as the hardware and software are upgraded to support new satellite constellations. Ballistic missile early warning capabilities will be enhanced significantly in the coming years as the Space-Based Infrared System High Satellites and Space Tracking and Surveillance Systems are launched and achieve operational capability.

Commercial Exploitation Teams (CETs) provide the capability to receive, exploit, and disseminate commercial satellite imagery products to Space elements, warfighters and coalition elements in the supported combatant commander's area of operations. Commercial Exploitation Teams work in collaboration with National Geospatial-

Intelligence Agency (NGA) Support Teams, the topographic community and collection managers — the Commercial Exploitation Team brings the "warfighter" perspective. Currently the Central Command theater Commercial Exploitation Team provides invaluable support to the combatant commanders and our international partners, by obtaining timely imagery from commercial vendors in support of those who can make a difference. These commercial images are key to sharing information with the Iraqi government, enabling it to assume a greater role in Iraq's security, and to support the thousands of others working to stabilize the country and build its infrastructure.

Space-based capabilities provide or facilitate the exchange of vital information required to support and sustain multinational and coalition operations. These complementary and reinforcing effects minimize vulnerabilities and enable the delivery of combat power greater than the sum of individual parts.

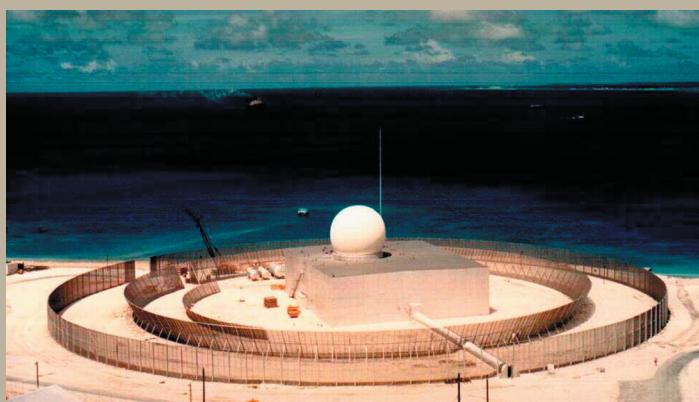
The Army's Space Cadre

In 1998, the Army recognized the need for a cadre of Space Professionals who were specifically trained in and knowledgeable of Space-based capabilities and their employment in support of the Warfighter. This was actually several years ahead of the 2001 tasking by former Secretary of Defense Donald H. Rumsfeld to develop and maintain a cadre of Space-qualified professionals. The Army established the Space operations functional area designated FA40 "Space Operations" in order to identify and manage its Space Professionals. Career specialists whose principal duties include planning, developing, resourcing, acquiring, integrating or operating Space forces, concepts, applications, or capabilities in accordance with Department of Defense Directive 3100.1 and Joint

Part of the 1950 NIKE-Zeus project, the Zeus Acquisition Radar (ZAR), the first track-while-scan

radar, was but one element of this intricate network of seven radars and the ZEUS interceptor.

COURTESY PHOTO



Publication 3-14. These Space Operations Officers/Functional Area 40 (FA40) Officers form the core of the Army Space Cadre. This relatively small (less than 200 officers) but significant population is focused on integrating Space Force Enhancement into Army-wide operational and strategic planning.

In 2005, the Army Space Council approved the formation of the Space Cadre Office and cadre definitions for use in identifying Space Professionals as well as Space Enablers; those personnel assigned to positions whose primary career field is not Space, but perform unique tasks or functions or may require skills to apply Space capabilities. Armed with cadre definitions, the Army used FORMAL, a capstone Army Force Management Analysis tool, to look both horizontally and vertically across the Army in order to identify the Army's Space Enablers. The Army identified more than 1,700 Space Enabler positions that are being filled with civilians, non-FA40 Officers, Warrant Officers and Enlisted Soldiers. In January 2006, the Vice Chief of Staff Army agreed with the Army Space Council way ahead and directed SMDC to "continue to manage the program."

Coordinating the objectives and efforts of our Space Professionals and our Space Enablers (the Army's Space Cadre) in order to maximize the Army's Space and Integrated Missile Defense support to the warfighter is one of SMDC/ARSTRAT's highest priorities. In order to continue to successfully influence the development of Space and Integrated Missile Defense initiatives, the Army must make efficient and effective use of its Space Cadre.

Army Space Operations Officers have been serving in Joint Space locations since inauguration of the functional area in 1998. The initial authorized structure listed 50-plus Joint positions within what were then the U.S. Space Command, North American Aerospace Defense Command and the National Security Space Architect Office. This number has grown with the evolution of these commands into the U.S. Strategic Command and National Security Space Office.

A concentrated effort began in 2006 to identify Army and Joint locations still lacking Army Space expertise and to determine the best way to expand the presence of FA40s in these key command locations. As a direct result, Army Space Operations Officers have been placed in the Air Force Space

and Missile Systems Center, the Joint Functional Component Command for Space (JFCC Space) and Space and Naval Warfare Systems Center. The Army has also placed Space Operations Officers with Office of the Secretary of Defense, Defense System Information Agency, National Reconnaissance Office Army Coordination Team, Defense Advanced Research Projects Agency and numerous Combatant Commands. Future Army efforts will focus on expanding the presence of Army Cadre (both Space Professionals and Space Enablers) at these locations and throughout the National Security Space Community.

To assure standardized training of Space Professionals, the Army uses portions of the Air Force Space curriculum in the 11-week long Army Space Operations Officer Qualification Course managed by SMDC's Future Warfare Center. Air Force Space Command's National Security Space Institute Space 200 course focusing on the concepts of Orbital Mechanics, Acquisition, Space Law, Policy and Doctrine, and the integration of Space effects into the Joint fight, constitutes the first four weeks of the Army's course. Recently, Army Space Operations Officers, many who are combat veterans, have been added to the National Security Space instructor staff. The result is a stronger Joint perspective on Space education which benefits all services who attend the National Security Space Institute. In concert with the Air Force's Institute of Technology, an effort is currently underway to establish a graduate degree program and to assign an Army Space Operations Officer to its staff.

The Army's Space Master Plan

The Army's effort to assure standardized training of Army Space Professionals transcends its close relationship with Air Force Space Professionals. Army Space Operations Officers have graduated from the Naval Postgraduate School since 1999 and keep providing timely and relevant input to the school's Space curriculum. In recognition of the Army's standardization of Space Cadre training, Air Force Space Command recently authorized the wearing of the Air Force Space Badge by qualified Army personnel.

Space-based capabilities, leveraged by Army



Space Professionals, provide enhanced information superiority and situational awareness, permitting high-tempo, noncontiguous, simultaneous distributed operations. When integrated with complementary airborne and terrestrial-based systems, Space-based systems provide the Joint Warfighter and operational commanders with unprecedented options that enable strategic responsiveness.

The Army developed a comprehensive Army Space Master Plan outlining how to best guide the development of Space capabilities, and to incorporate those capabilities as key enablers into its current and future forces. There are three core Army Space objectives guiding the assessment and prioritization of these capabilities.

These objectives are to:

- Influence development and design of future Space systems and their operational concepts to support the full range of joint ground force operations;
- Improve the ability to exploit Space systems by the current and future force; and
- Facilitate delivery of Space capabilities that address Army requirements.

Achieving these objectives requires an Army combat developer community that can understand, substantiate, articulate and defend Space requirements supporting the Warfighter. The Army must continue to influence the development, design and deployment of National assets to incorporate responsive, assured and timely support to maneuver commanders from the initial design phases. To fully exploit these future and current Space-based assets, a complementary mix of highly trained Army Space Cadre and other Space Professionals is needed, particularly within the areas of satellite communications (SATCOM) and intelligence, surveillance and reconnaissance platforms.

There are, however, associated issues the Army must address to ensure future force mission success. Military SATCOM (MILSATCOM) programs, for example, must stay on schedule and meet performance level criteria to serve as the primary means of transmitting mission-critical Joint Command and Control, Joint Blue Force Situational Awareness, combat identification, Theater Early Missile Warning and Blue Force Tracking activities related information and data. The Army Space Master Plan recommends the Army seek innovative solutions, including partnering with commercial providers, to overcome MILSATCOM shortfalls in capacity, user access, and delays in capability improvements.



Space Technology for the Army— Operationally Responsive Space

SMDC/ARSTRAT's Technical Center is actively supporting the Joint service Operationally Responsive Space (ORS) Office whose goal is to provide responsive, operationally relevant Space capabilities to the Joint Warfighter. One of ORS' primary objectives is to provide and exploit these kinds of on-orbit capabilities quicker than today, with a shorter development and acquisition cycle. To meet this and other key objectives, ORS uses the most expeditious requirements definition, resource allocation and acquisition processes available to meet the urgent needs of the Joint warfighter. The Army is supporting this initiative by providing a Deputy Director to the ORS office, as well as by staffing other key positions within the office. Responsiveness is the most desired attribute across the entire ORS enterprise range of activities.

The Tactical Satellite Demonstration Program is one example of ORS' commitment to responsiveness. Tactical Satellite's objective is to build smaller, relatively inexpensive, simpler satellites to provide relevant Space capabilities, and demonstrate military utility through operational experimentation. This will enable the capability to build, store, and launch on demand a class of small, inexpensive satellites with plug and fight payloads tailored to meet the existing and emerging needs of the warfighter. Payload concepts addressing communications on the move and persistent battlefield surveillance/characterization are currently being worked in a joint, collaborative environment with the other services and combatant commanders — SMDC/ARSTRAT's Technical Center is the Army's executive agent for Tactical Satellite project planning, development and execution.

Space Superiority— Preserving Space Capabilities

Although the U.S. currently possesses overwhelming Space capabilities, its dominance in Space is not guaranteed. Our Space-based systems, communication links, and ground stations present potentially attractive targets to an adversary seeking to level the battlefield. Preserving and protecting U.S. military Space-enabled capabilities requires Space situational awareness. Just as situational awareness in the terrestrial sense provides Joint warfighters with tactical advantage, Space situational awareness enables commanders to understand the factors that could impact Space information superiority. Investments in Space situational awareness capability represent the most fundamental step in preserving our Space advantage.

Conclusion

Over the past 50 years, particularly within the past 15 years, the joint combat operating environment has evolved, extending vertically into Space. The Army is proud of the rapid growth and subsequent involvement of its professional Space cadre in providing the Joint warfighter with capabilities that simply cannot be matched by terrestrially based assets. In a very short period of time, the Joint warfighter has moved from being just "supported" by Space assets to being truly "Space enabled." Space-based capabilities enable the Joint warfighter to see further, communicate faster, act more quickly and dominate the battlefield in ways only dreamt about when the U.S. Army helped launch America into Space nearly 50 years ago. The linkage between the Army and Space will continue to grow. 



"SECURE THE HIGH